WHAT IS CLAIMED IS:

1. A method for measuring characteristics of nanoscopic objects using detection of photons emitted from the objects, the method comprising:

moving a tip of a probe coupled to a cantilever toward a feature of a sample to influence a rate of emission from the feature of the sample;

illuminating using a first intensity level of electromagnetic energy the feature of the sample during a first predetermined portion of movement of the cantilever to capture a signal at a detector from the sample; and

changing the first intensity level to a second intensity level during a second predetermined portion of movement of the cantilever.

2. The method of claim 1 wherein the second intensity level is lower than the first intensity level.

3. The method of claim 1 wherein the second intensity level is near zero.

4. The method of claim 1 wherein the movement of the cantilever is a portion of an oscillating action of the cantilever.

5. The method of claim 1 whereupon changing the first intensity level to the second intensity level, the second intensity level being lower than the first intensity level changes a capability of emitting photons from the feature of the sample.

6. The method of claim 5 wherein the capability of emitting photons is increased.

7. The method of claim 1 wherein the changing is provided using a switch that blocks an illumination of the first intensity level.

8. The method of claim 1 wherein the changing is provided by an electro-optic modulator material that blocks an illumination of the first intensity level to cause the second intensity level.

9. The method of claim 1 wherein the changing is provided by an acousto-optic modulator material, the acousto-optic modulator material being adapted to block an illumination at the first intensity level to cause the second intensity level.

10. The method of claim 1 wherein the sample is a fluorophore.

11. The method of claim 1 wherein the sample is selected from a collection of fluorophores, a fluorescent particle, or a bead.

12. The method of claim 1 wherein the sample comprises a biological molecule coupled to a fluorophore, the sample having a pre-determined life.

13. The method of claim 1 wherein the sample is a quantum dot or other solid state entity with tunable fluorescent property.

14. The method of claim 1 wherein the sample is a biological molecule coupled to a quantum dot or other solid state entity.

15. The method of claim 1 wherein the sample is a collection of quantum dots or other solid-state entities.

16. The method of claim 1 wherein the sample is a biological molecule coupled to a plurality of quantum dots or other solid-state entities.

17. A system for measuring characteristics of nanoscopic objects using detection of photons emitted from the objects, the system comprising one or more computer memories, the one or more computer memories including:

a first code directed to cause movement of a tip of a probe coupled to a cantilever member toward a feature of a sample to influence a rate of emission from the feature of the sample;

a second code directed to apply illumination using a first intensity level of electromagnetic energy to the feature of the sample during a first predetermined portion of movement of the cantilever member to capture a signal from the feature at a detector from the sample; and

a third code directed to output a control signal to switch the first intensity level to a second intensity level during a second predetermined portion of movement of the cantilever member.

18. The system of claim 17 further comprising a fourth code directed to provide a control signal to initiate a relative motion between a region of illumination and a portion of the sample.

19. The system of claim 18 further comprising a fifth code directed to provide a control signal to initiate a relative motion between a region of the cantilever member and a portion of the sample.

20. The system of claim 17 wherein the second intensity level is lower than the first intensity level.

21. The system of claim 17 wherein the second intensity level is zero.

22. The system of claim 17 wherein the movement of the cantilever is a portion of an oscillating action of the cantilever.

23. The system of claim 17 whereupon changing the first intensity level to the second intensity level, the second intensity level being lower than the first intensity level changes a capability of emitting photons from the feature of the sample.

24. The system of claim 15 wherein the capability of emitting photons is increased.

25. The system of claim 17 wherein the third code directed to switch is coupled to a switch means that blocks an illumination at the first intensity level.

26. The system of claim 17 wherein the third code directed is coupled to an electro-optic modulator material that blocks an illumination of the first intensity level to cause the second intensity level.

27. The system of claim 17 wherein the third code directed is coupled to an acousto-optic modulator material that blocks an illumination of the first intensity level to cause the second intensity level.

28. The system of claim 17 wherein the sample comprises a biological molecule coupled to a fluorophore, the sample having a pre-determined life.

29. The system of claim 17 wherein the sample is a quantum dot or other solid-state entity with tunable fluorescent property.

30. The system of claim 17 wherein the first code, second code, and third code are provided on a fixed memory.

31. A method for operating an apertureless microscope for viewing microscopic features of an objects to molecular sensitivity, the method comprising:

aligning an alignment beam to a tip coupled to a cantilever through a probe or a portion of the cantilever within a first assembly, the first assembly coupling the alignment beam to the tip of the cantilever or the portion of the cantilever;

coupling the first assembly to an optical sub-system to facilitate spatial movement between the first assembly and the optical sub-system through a spatial translation axis;

adjusting the tip or the portion of the cantilever toward a test surface to focus the tip to a predetermined region of the test surface on the optical sub-system using the spatial translation axis;

adjusting a relationship between the alignment beam and the first assembly to an excitation laser such that the tip or the portion of the cantilever in the first assembly is within a vicinity of 1 micron of the excitation laser; and

tuning the excitation laser to align the tip or the portion of the cantilever using movement of the first assembly on the spatial translation axis.

32. The method of claim 31 wherein the alignment beam is an AFM laser.

33. The method of claim 31 wherein the tuning is provided using a computer code directed to move a relative spatial location of the alignment beam and cantilever within about 10 nm from the excitation laser.

34. The method of claim 33 wherein the code is provided within a memory of a computer, the computer being coupled to the assembly.

35. The method of claim 31 wherein the adjusting of the relationship is provided using a shadow recognition process of a spatial location of the cantilever relative to the excitation laser.

36. The method of claim 35 wherein the shadow recognition process comprises a photo diode to detect an edge of the cantilever.

37. An apertureless microscope system for viewing one or more features of samples to a resolution of molecular sensitivity, the system comprising:

a member for supporting the apertureless microscope system;

a support structure coupled to the member to support the member;

a plurality of shock absorbing devices coupling the support structure and the member, the plurality of shock absorbing devices being capable of substantially eliminating a possibility of mechanical noise from the floor structure;

an enclosure structure coupled to the member and covering the apertureless microscope system and being configured to house the apertureless microscope within an opening confined within the enclosure structure;

a sound absorbing member coupled to the enclosure structure to substantially eliminate a possibility of acoustic noise from entering into the opening within the enclosure structure; and

an inner liner coupled within the enclosure structure to absorb one or more stray photons within the enclosure structure, the inner liner being capable of substantially preventing the stray photons from being released back into the enclosure structure.

38. The system of claim 37 further comprising a reflecting surface overlying the absorbing member and configured to substantially eliminate a desired acoustic noise from entering into the opening within the enclosure structure by reflecting the desired acoustic noise on the reflecting surface.

39. The system of claim 37 wherein opening within the enclosure structure has a mechanical vibration level within a predetermined limit, the predetermined limit being less than ½ of a signal derived from the apertureless microscope.

40. The system of claim 37 wherein the system is provided to allow one or more human beings to work around the system without substantial interference with one or more measurements from the apertureless microscope.

41. The system of claim 37 wherein the opening is free from organic material contaminants.

42. The system of claim 37 wherein the plurality of shock absorbing devices removes high frequency components from the mechanical noise.

43. The system of claim 38 wherein the reflecting material comprises Mylar overlying the sound absorbing member, the sound absorbing member overlying the enclosure structure, the enclosure structure being a rigid and dense material.

44. The system of claim 37 wherein the opening is maintained in a rich oxygen bearing environment.

45. The system of claim 37 wherein the opening is maintained in a non-reactive environment.

46. A method for operating a scanning system in a substantially noise free environment for viewing one or more features of samples to a resolution of molecular sensitivity, the method comprising:

inserting a sample having a molecular feature on a stage of an apertureless microscope system, the apertureless microscope system including at least a scanning apparatus including a probe coupled to an optical imaging apparatus, the optical imaging apparatus being adapted to capture information having a feature size of less than five nanometers from a portion of the sample;

maintaining at least the stage and the sample in an opening confined by an enclosure structure, the enclosure structure being coupled to a member for supporting a portion of the apertureless microscope system;

maintaining at least the stage and the sample free from mechanical vibration noise using a plurality of shock absorbing devices coupling the member, the plurality of shock absorbing devices being capable of substantially eliminating a possibility of mechanical vibration noise from an external source;

maintaining at least the stage and the sample free from acoustic noise using a sound absorbing member coupled to the enclosure structure to substantially eliminate a possibility of the acoustic noise from interacting with the captured information; and

capturing one or more stray photons within the opening of the enclosure structure using an inner liner coupled within the enclosure structure to absorb the one or more stray photons within the enclosure structure, the inner liner being capable of substantially

preventing the one or more stray photons from being released back into the opening of the enclosure structure.

47. The method of claim 46 further comprising maintaining the opening in isolation of acoustic noise using a reflecting surface overlying the absorbing member, the reflecting surface configured to substantially eliminate the acoustic noise from entering into the opening within the enclosure structure by reflecting the acoustic noise on the reflecting surface.

48. The method of claim 46 wherein the mechanical vibration level is within a predetermined limit, the predetermined limit being less than 10% of a signal derived from the apertureless microscope system.

49. The method of claim 46 wherein the method is provided to allow one or more human beings to work around the apertureless microscope system without substantial interference with one or more measurements of the portion of the sample on the stage of the apertureless microscope system.

50. The method of claim 46 further comprising maintaining the opening free from organic material contaminants for a predetermined amount of time.

51. The method of claim 46 wherein the plurality of shock absorbing devices removes high frequency components.

52. The method of claim 47 wherein the reflecting material comprises Mylar overlying the sound absorbing member, the sound absorbing member overlying the enclosure structure, the enclosure structure being a rigid and dense material.

53. The method of claim 46 further comprising exposing the opening to a rich oxygen bearing environment and maintaining the rich oxygen bearing environment for a predetermined portion of time.

54. The method of claim 46 further comprising maintaining the opening in a non-reactive environment for a predetermined portion of time.

55. A method for operating an apertureless microscope for observing one or more features to a molecular sensitivity on objects, the method comprising:

moving a nanotube based tip of a probe coupled to a cantilever in a vicinity of a feature of a sample, the feature of the sample emitting one or more photons at a detected rate relative to a background rate of the sample based upon the presence of the nanotube based tip of the probe in the vicinity of the feature; and

modifying the detected rate of the feature of the sample, whereupon the modifying of the detected rate causes the feature of the sample to enhance relative to background rate of the feature

56. The method of claim 55 wherein the nanotube based tip comprising a metal coating.

57. The method of claim 56 wherein the metal is platinum bearing, gold bearing or silver bearing.

58. The method of claim 55 wherein the modifying is a quenching of the detected rate.

59. The method of claim 55 wherein the tip comprises a silicon bearing material.

60. The method of claim 55 wherein the tip comprises a silicon nitride bearing material.

61. The method of claim 55 wherein the nanotube based tip is semiconductive.

62. The method of claim 55 wherein the nanotube based tip is intrinsically conductive carbon or metallically coated to be conductive.

63. The method 55 wherein the nanotube is selected from a rope, or a bundle of nanotubes, the nanotube is made of a material characterized from at least a semiconductive, metallic or semiconductor and metallic.

64. The method 63 wherein the nanotube is metallically coated to be conductive and/or to improve adhesion to the probe for imaging in liquids.

65. The method 63 wherein the nanotube is adhesively attached to the probe to enable contrast enhancement while imaging in a liquid.

66. The method of claim 55 wherein the nanotube based tip is conductive carbon having a cylindrical shape.

67. The method of claim 55 wherein the nanotube based tip is cylindrically shaped having an end of about 10 nm and less.

68. The method of claim 55 wherein the nanotube based tip is cylindrically shaped having an end diameter or end features between 1 and 5 nm.

69. The method of claim 55 wherein the nanotube based tip comprises an extended nanotube portion between 5 and 100 nm in length or between 10 and 30 nm or less than 250 nm.

70. The method of claim 55 wherein the nanotube based tip is coated with a material with doping selected from phosphorus, arsenic, and boron such that it is conductive.

71. The method of claim 55 wherein the nanotube tip comprises a first material overlying a second material.

72. The method of claim 55 wherein the nanotube tip comprises more than one tip end, each tip end being separated from another tip.

73. An apertureless microscope system for observing one or more features to a molecular sensitivity on objects, the system comprising:

a nanotube based tip of a probe coupled to a cantilever operable to move in a vicinity of a feature of a sample to cause a contrast between a surrounding material by a presence of the probe either through increased rate of photon emission or by a decrease in the rate of photon emission relative to a background rate of the sample based upon the presence of the nanotube based tip of the probe in the vicinity of the feature; whereupon the nanotube based tip modifies the detected rate of the feature of the sample, the modifying of the detected rate causes the feature of the sample to enhance a contrast relative to background rate of the feature.

74. The system of claim 73 wherein the nanotube based tip comprising a metal coating.

75. The system of claim 71 wherein the metal is platinum bearing, gold bearing, silver bearing, cobalt bearing, etc..

76. The system of claim 73 wherein the modifying is a quenching of the detected rate.

77. The system of claim 73 wherein the tip comprises a silicon bearing material.

78. The system of claim 73 wherein the nanotube based tip comprises a single walled structure.

79. The system of claim 73 wherein the nanotube based tip comprises a multi-walled structure.

80. The system of claim 73 wherein the nanotube based tip is electrically conductive, and considered to act as a metal.

81. The system of claim 73 wherein the nanotube based tip comprises an oxide bearing material.

82. The system of claim 73 wherein the nanotube based tip has an end of about 20 nm and less.

83. The system of claim 73 wherein the nanotube based tip has an end of about 2 nm and less.

84. The system of claim 73 wherein the nanotube based tip comprises an extended nanotube portion.

85. The system of claim 73 wherein the nanotube based tip comprises a doping selected from phosphorus, arsenic, and boron.

86. The system of claim 73 wherein the nanotube tip comprises a first material overlying a second material.

87. The system of claim 73 wherein the nanotube tip comprises more than one tip end, each tip end being separated from another tip.

88. A method for dynamically viewing an increased field of view based upon a smaller fixed field of view to capture an image of features of samples to molecular sensitivity, the method comprising:

illuminating through a fixed lens using a beam a feature of a sample, the beam being directed toward at least one tip of a probe, the tip being in a vicinity of the feature of the sample;

scattering portion of the beam off a portion of the tip of the probe;

detecting the scattered portion of the beam;

processing the scattered portion of the beam to determine a pattern to identify a relationship between the tip and the beam for spatial alignment between the tip and the beam; and

adjusting a position of the beam used for illumination based upon at least the pattern to maintain a desired relationship between the tip and the beam.

89. The method of claim 88 wherein the beam is selected from an illumination beam or a detection beam.

90. The method of claim 88 wherein the probe is an AFM probe.

91. The method of claim 88 wherein the position of the sample is fixed.

92. The method of claim 88 wherein the beam is for illuminating the feature and detecting the pattern.

93. The method of claim 88 wherein the illuminating is provided by a separate wavelength.

94. The method of claim 88 wherein the scattering is provided off of the tip.

95. The method of claim 88 wherein the illuminating, scattering, detecting, processing, and adjusting are provided with observing the feature at a predetermined portion of time.

96. The method of claim 88 wherein the tip oscillates at a few Hertz-and moves a few microns up to ten microns per second.

97. The method of claim 88 wherein the pattern has a periodic variation of intensity as a spatial function.

98. The method of claim 88 wherein the adjusting is provided using a mirror device interposed between a source and the lens.

99. The method of claim 88 wherein the sample is moved relative to the tip.

100. A system for dynamically viewing an increased field of view based upon a smaller field of view to capture an image of features of samples to molecular sensitivity, the system comprising:

an electromagnetic energy source, the electromagnetic energy source being capable of emitting a beam;

a fixed lens coupled to the electromagnetic energy source, the fixed lens being adapted to focus the beam toward at least one tip of a probe, the tip being in a vicinity of a feature of a sample to scatter a portion of the beam off a portion of the tip of the probe;

a detector coupled to the fixed lens, the detector being adapted to detect the scattered portion of the beam;

a processor coupled to the detector, the processor being adapted to process the scattered portion of the beam to determine a pattern to identify a relationship between the tip and the beam for a spatial alignment between the tip and the beam; and

an adjustment device coupled to the processor, the adjustment device being adapted to adjust a position of the beam based upon at least the pattern to maintain a desired relationship between the tip and the beam.

101. The system of claim 100 wherein the electromagnetic radiation source is selected from an illumination beam or a detection beam.

102. The system of claim 100 wherein the probe is an AFM probe.

103. The system of claim 100 wherein the position of the sample is fixed.

104. The system of claim 100 further comprising an illuminator coupled to the processor, the illuminator being adapted to illuminate the sample.

105. The system of claim 100 wherein the beam is at a different wavelength from light from the illuminator.

106. The system of claim 100 wherein the scattering is provided off of the tip of the probe.

107. The system of claim 100 further comprising a controller coupled to the processor.

108. The system of claim 100 wherein the tip oscillates at a few Hertz-and moves a few microns up to ten microns per second.

109. The system of claim 100 wherein the pattern has a periodic variation of intensity as a spatial function.

110. The system of claim 100 wherein the adjustment device includes a mirror device interposed between the electromagnetic source and the fixed lens.

111. The system of claim 100 wherein the sample is moved relative to the tip.

112. A scanning microscope for viewing one or more features of molecular scale and below, the system comprising:

a support stage for holding an object to be observed;

a tip coupled to a probe, the tip being configured within a vicinity of a feature of the object;

an illumination source directed to apply electromagnetic radiation from the illumination source to the tip of the probe;

a filter coupled to the object to substantially eliminate amplified spontaneous emission (ASE) from a power spectrum of the electromagnetic radiation;

an object illumination source coupled to the support to illuminate at least the feature of the object; and

a detector coupled to the object to capture signals from at least the feature of the object, the signals being derived from a detection band from the object illumination source.

113. The system of claim 112 wherein the illumination source is a laser.

114. The system of claim 112 wherein the laser is a 670-690 nm-semiconductor laser.

112. The system of claim 109 wherein the illumination source is an AFM source.

113. The system of claim 112 wherein the filter is provided in a laser head of the illumination source.

114. The system of claim 112 wherein the signals are fluorescence signals substantially free from a background noise.

115. The system of claim 112 wherein the illumination source consists essentially of a preselected band.

116. The system of claim 112 wherein the illumination source uses a band that is different from the detection band.

117. A scanning microscope for viewing one or more features of molecular scale, the system comprising:

a support stage for holding an object to be observed, the support stage adapted to output position information;

a tip coupled to a probe, the tip being configured within a vicinity of a feature of the object;

an illumination source directed to apply electromagnetic radiation from the illumination source to the tip of the probe;

an object illumination source coupled to the support to illuminate at least the feature of the object; and

a detector coupled to the object to capture signals from at least the feature of the object, the signals being derived from a detection band from the object illumination source;

a position detector coupled to the support stage, the position detector outputting position information from the support stage; and

a controller coupled to the position detector, the controlling being adapted to output a drive signal based upon at least the position information from the position defector.